Attorney Docket No. BILL-002

APPLICATION

FOR UNITED STATES LETTERS PATENT

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT I, **Lanny D. Billings**, a citizen of the United States, have invented a new and useful stone cutting system of which the following is a specification:

Stone Cutting System

CROSS REFERENCE TO RELATED APPLICATIONS

Not applicable to this application.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable to this application.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to stone cutting devices and more specifically it relates to a stone cutting system for efficiently cutting stones of various shapes and sizes.

Description of the Related Art

Stone cutter devices have been in use by stone masons for years for cutting individual stones into a desired shape and size. Conventional stone cutters are typically hand-operated tools with a stone cutting blade that are only capable of cutting

one stone at a time. Conventional stone cutters are typically utilized for cutting flat tile (e.g. ceramic, stone) and are not suitable for cutting a body of a stone into two or more segments.

U.S. Patent No. 6,263,866 to Tsao teaches a conventional stone cutter that has a cutting stone that is designed solely for cutting a flat tile member. U.S. Patent No. 4,520,880 to Saito teaches a stone cutter that divides a mass of stone into pieces such as large stones found at a rock quarry.

Another type of stone cutter is manufactured by VINCI STONE PRODUCTS, INC. under the trademark PORTA CUT. The PORTA CUT is a hydraulic stone cutter that utilizes a vertical blade pressed into the stone by a plurality of hydraulic cylinders thereby splitting the stone into a desired shape and size.

The prior art technology of stone cutting does not teach a system for efficiently cutting stones of various shapes and sizes. Conventional stone cutters typically require the stone to be precut into a desired shape (e.g. flat) and can only cut one stone at a time.

While these devices may be suitable for the particular purpose to which they address, they are not as suitable for efficiently cutting stones of various shapes and sizes. Conventional stone cutters are not as suitable for efficiently cutting stones of various shapes and sizes.

In these respects, the stone cutting system according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in so doing provides an apparatus primarily developed for the purpose of efficiently cutting stones of various shapes and sizes.

BRIEF SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of stone cutting devices now present in the prior art, the present invention provides a new stone cutting system construction wherein the same can be utilized for efficiently cutting stones of various shapes and sizes.

The general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new stone cutting system that has many of the advantages of the stone cutting devices mentioned heretofore and many novel features that result in a new stone cutting system which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art stone cutting devices, either alone or in any combination thereof.

To attain this, the present invention generally comprises a retaining unit having a plurality of troughs capable of retaining a plurality of stone members, and a cutting unit having a plurality of blades that are extendable within each of the troughs for cutting the stone members.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the invention that will be described hereinafter and that will form the subject matter of the claims appended hereto.

In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the

following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of the description and should not be regarded as limiting.

A primary object of the present invention is to provide a stone cutting system that will overcome the shortcomings of the prior art devices.

A second object is to provide a stone cutting system for efficiently cutting stones of various shapes and sizes.

Another object is to provide a stone cutting system that is capable of simultaneously cutting a plurality of stones.

An additional object is to provide a stone cutting system that is capable of cutting a stone into two or more pieces.

A further object is to provide a stone cutting system that is capable of cutting various types of stone material.

Another object is to provide a stone cutting system that is capable of cutting stones into various widths.

Other objects and advantages of the present invention will become obvious to the reader and it is intended that these objects and advantages are within the scope of the present invention.

To the accomplishment of the above and related objects, this invention may be embodied in the form illustrated in the accompanying drawings, attention being called

to the fact, however, that the drawings are illustrative only, and that changes may be made in the specific construction illustrated and described within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Various other objects, features and attendant advantages of the present invention will become fully appreciated as the same becomes better understood when considered in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the several views, and wherein:

FIG. 1 is an upper perspective view of the present invention.

FIG. 2 is an upper perspective view of the present invention with the blades cutting the stone members within one of the troughs.

FIG. 3 is a side view of the present invention.

FIG. 4 is a side view of the present invention illustrating the blades cutting the stone members within a first trough.

FIG. 5 is a side view of the present invention illustrating the blades cutting the stone members within a second trough.

FIG. 6 is a side view of the blades positioned above a third trough within the retaining unit.

FIG. 7 is an end cutaway view of the blades cutting the stone members into stone pieces.

FIG. 8a is an upper perspective view of the cutting unit with the blades in the raised position.

FIG. 8b is an upper perspective view of the cutting unit with the blades in the lowered position.

FIG. 9 is an exploded upper perspective view of the retaining unit with respect to the support stand and conveyor.

DETAILED DESCRIPTION OF THE INVENTION

A. Overview

Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, FIGS. 1 through 9 illustrate a stone cutting system **10**, which comprises a retaining unit **20** having a plurality of troughs **22** capable of retaining a plurality of stone members **12**, and a cutting unit **40** having a plurality of blades **42** that are extendable within each of the troughs **22** for cutting the stone members **12**.

B. Retaining Unit

The retaining unit **20** has at least one trough **22** capable of receiving a plurality of naturally shaped stone members **12**. As shown in Figures 1 and 9 of the drawings, the retaining unit **20** preferably has a plurality of troughs **22** substantially parallel to one another. The troughs **22** are preferably comprised of an elongate structure with a uniform width as further shown in Figures 1 and 9 of the drawings. The troughs **22** are preferably formed for non-movably receiving a plurality of stone members **12** in a longitudinal manner as shown in Figure 1 of the drawings.

The troughs **22** are formed by one or more partition walls **23** that may be adjustable to allow for adjustment of the width of the troughs **22**. The plurality of troughs **22** may have varying widths to accommodate various sizes of stone members **12**.

Each of the troughs **22** includes a floor **28** for supporting the stone members **12**. The floor **28** preferably includes a plurality of slots that allow for the passing through of a plurality of cut stone pieces **14** as shown in Figures 1 and 7 of the drawings. The slots are sized to allow for proper support of the stone members **12** prior to cutting

while allowing for the cut stone pieces **14** to freely pass through onto the conveyor unit **30**. The plurality of slots are preferably substantially parallel to a longitudinal axis of the troughs **22** as shown in Figure 1 of the drawings. Alternatively, the floor **28** may be movably attached (e.g. pivotal, removable, etc.) to the retaining unit **20** for allowing the passing through of a plurality of cut stone pieces **14**.

Each of the troughs **22** preferably includes a compression member **26** at an end thereof that is capable of compressing a plurality of stone members **12** in a longitudinal manner as shown in Figures 1, 7 and 9 of the drawings. At least one actuator unit **25** is preferably attached to the compression member **26** and the retaining unit **20** for extending/retracting the compression member **26** as shown in Figure 7 of the drawings. The actuator unit **25** may be comprised of an electrical actuator or hydraulic actuator. An end member **24** is preferably positioned opposite of the compression member **26** which may be comprised of a severable material such as wood for receiving a portion of the blades **42** during cutting.

The retaining unit **20** is preferably movably positioned with respect to the cutting unit **40** along a path substantially transverse to a cutting path of the cutting unit **40** as shown in Figures 1 through 6 of the drawings. One or more support rails **21** attached to a support stand **29** and to the retaining unit **20** allow for the retaining unit **20** to move horizontally with respect to the cutting unit **40** as shown in Figures 3 through 6 of the drawings. The retaining unit **20** may be manually manipulated or mechanically manipulated via an actuator or similar device.

C. Cutting Unit

The cutting unit **40** has at least one blade capable of cutting through a stone material (e.g. granite). The cutting unit **40** is preferably comprised of a gang saw structure wherein multiple blades **42** may be interchanged and spaced apart a desired distance for cutting stone members **12** of different sizes and for creating stone pieces

14 of different widths. The blades **42** are capable of being extended within the at least one of the troughs **22** for cutting a plurality of stone members **12** into a plurality of stone pieces **14** as shown in Figures 2 and 7 of the drawings.

The cutting unit **40** is preferably movable in a vertical manner to allow for lowering of the cutting blades **42** into the troughs **22** of the retaining unit **20** as shown in Figures 1 and 2 of the drawings. The cutting unit **40** is also preferably movable in a horizontal manner substantially parallel to the at least one trough **22** for cutting the stone members **12**.

The cutting unit **40** may be comprised of a motor **44** mechanical attached to a shaft supporting the blades **42** mounted upon a platform as shown in Figures 8a and 8b of the drawings. The platform is slidably supported upon a support member **46** and is mechanically connected to a manipulation structure (e.g. cable, chain, etc.) for positioning the platform in a desired location along the support member **46**.

A pair of opposing vertical supports **48** are attached to the opposing ends of the support member **46** for vertically supporting the support member **46** in an adjustable manner as shown in Figures 8a and 8b of the drawings. The support member **46** may be vertically adjusted with respect to the vertical supports **48** via a conventional lifting/lower structure such as an actuator or chain/cable structure.

D. Conveyor Unit

The conveyor unit **30** is preferably positioned beneath the retaining unit **20** for transferring a plurality of cut stone pieces **14** that fall through the floor **28** within the retaining unit **20**. The conveyor unit **30** is preferably positioned beneath the support stand **29** as shown in Figures 1 through 7 of the drawings. The conveyor unit **30** may be comprised of any conventional conveyor structure.

E. Operation

In use, the user first adjusts the troughs **22** within the retaining unit **20** to their desired widths in order to accommodate the various sizes and shapes of stone members **12**. Once the troughs **22** are organized, the user then positions the appropriate sized stone members **12** within the troughs **22** as shown in Figures 1 and 9 of the drawings. Once the troughs **22** are filled with the stone members **12** end-to-end in a longitudinal manner, the user then manipulates the compression member **26** within each of the troughs **22** to compress the stone members **12** together in a relatively tight manner. The user next determines the desired thickness of the stone pieces **14** to be cut and adds/removes the appropriate number of blades **42** from the cutting unit **40**. The user may also adjust the spacing between the blades **42** to create stone pieces **14** having varying widths.

Once the stone members **12** have been properly compressed together and the desired number of blades **42** have been installed, the user then operates the cutting unit **40** to rotate the blades **42** and then lowers the cutting unit **40** so that the blades **42** begin to cut the stone members **12** within the first trough **22** as shown in Figures 2 through 4 of the drawings. As the stone members **12** are cut into a plurality of stone pieces **14** (each having at least one flat surface), the stone pieces **14** fall through the slots within the floor **28** of the trough **22** as shown in Figure 7 of the drawings. The cutting unit **40** moves longitudinally along the first trough **22** cutting the stone members **12** within the first trough **22** as further shown in Figure 7 of the drawings. The cutting unit **40** is capable of sensing the hardness of the stone members **12** being cut and adjusts the movement speed accordingly.

After the stone members **12** within the first trough **22** have been completely cut into stone pieces **14**, the cutting unit **40** is then elevated and the retaining unit **20** is moved so that the second trough **22** is aligned with the blades **42** as shown in Figure 5 of the drawings. The user may have to adjust the number/spacing of the blades **42** if

the second trough **22** is a different width. The user then uses the cutting unit **40** to cut the stone members **12** contained within the second trough **22**. The above-stated process continues until all of the stone members **12** within the retaining unit **20** have been cut into the desired stone pieces **14**. The cut stone pieces **14** may then be further processed (e.g. polishing, etching, etc.).

What has been described and illustrated herein is a preferred embodiment of the invention along with some of its variations. The terms, descriptions and figures used herein are set forth by way of illustration only and are not meant as limitations. Those skilled in the art will recognize that many variations are possible within the spirit and scope of the invention, which is intended to be defined by the following claims (and their equivalents) in which all terms are meant in their broadest reasonable sense unless otherwise indicated. Any headings utilized within the description are for convenience only and have no legal or limiting effect.